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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/855,673	05/16/2001	Kazuyoshi Irie	503.36712VX1	2143
20457	7590	12/23/2005	EXAMINER	
ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			KERNS, KEVIN P	
			ART UNIT	PAPER NUMBER
			1725	

DATE MAILED: 12/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/855,673

Applicant(s)

IRIE ET AL.

Examiner

Kevin P. Kerns

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-24 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 May 2001 and 17 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 3-10, 15, 16, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossin et al. (US 6,069,291) in view of Tom et al. (US 6,030,591), and further in view of either Imamura (US 5,649,985) or Izumikawa et al. (US 6,022,489).

Rossin et al. teach a method of processing perfluoride compounds in which a gas stream containing the perfluoride compounds from a semiconductor process contacts a hot catalyst that is heated to a desired processing temperature. Rossin et al. teach that

Art Unit: 1725

the catalyst may be in the form of pellets, granules, or cylinders. Rossin et al. also teach that the temperature of the catalyst may be controlled and that air and water may be mixed with the gas flow before contacting this gas with the catalyst. An acid removal step, through a means such as a scrubber, may be performed after contacting the gas with the catalyst. (column 2, lines 53-65; column 3, lines 48-59; column 4, lines 9-18; and column 5, lines 13-47). The acid removing scrubber would also perform the same function as a cooler because of the cooling nature of the spray in a scrubber. One of ordinary skill in the art would have recognized from the teachings of Rossin et al. that the location of the acid removal step (via scrubber means) is on an "exhaust" side of the catalyst region used for the gas contacting process. Since the scrubber means is "downstream" of the catalyst region, one of ordinary skill in the art would readily arrange the scrubber means below the catalyst region, for the purpose of minimizing space that would normally be occupied by horizontally adjacent scrubber/catalyst region components of the processing apparatus, resulting in a more compact processing apparatus. Rossin et al. do not teach the use of a silicon component removal device and a (specifically disclosed) "cooling apparatus".

However, Tom et al. teach a method of processing halocarbons in effluent gas streams from semiconductor processing. Tom et al. note that the presence of these materials and other contaminants cause problems for adsorption recovery/recycle systems because they cause clogging of void space in the adsorbent. To solve this, the process employs a contaminant removal means, such as a wet scrubber to remove contaminants such as SiCl_4 . Tom et al. also teach that more than one scrubber may be

Art Unit: 1725

used in series and that check valves may be used to prevent back flow in the recovery/recycle process. (Tom et al.; column 3, lines 1-51; column 4, lines 7-26; column 5, lines 24-38; column 6, lines 62-67; and column 10, lines 13-18).

It would have been obvious to one of ordinary skill in the art at the time that the applicants' invention was made to have modified the process of Rossin et al. by the teachings of Tom et al. One of ordinary skill would have been motivated to use a wet scrubber to remove contaminants from the gas stream, as taught by Tom et al., before contacting the gas stream with the catalyst bed. Further, it would have been obvious to one of ordinary skill in the art to place the heated catalyst and acid scrubber in a single body in order to save valuable floor space, rather than spacing the processes apart with conduits running in between.

The former references teach and/or suggest the elements described above. However, these references do not teach the use of a heat exchanger and a (specifically disclosed) "cooling apparatus".

Imamura and Izumikawa et al. individually teach the use of heat exchangers (each of which serves as a "cooling apparatus") to exchange heat between gas that has exited a reactor and gas that is entering the reactor. (US 5,649,985; column 3, lines 10-15; and US 6,022,489; column 3, lines 20-23).

It would have been obvious to one of ordinary skill in the art at the time that the applicants' invention was made to have modified the process described above by the teachings of either Imamura or Izumikawa et al. One would have been motivated to use a heat exchanger ("cooling apparatus") to exchange heat between the hot catalytic

Art Unit: 1725

exhaust gas and water that is being added before the catalyst in order to raise the water temperature and reduce the cost of heating the catalyst to the proper process temperature.

With regard to the claim limitations that relate to functionality of the structural elements of the apparatus, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Regarding the specific materials (e.g. water and steam added after exhaust gas has been exhausted/exited, as recited in all independent claims 1, 15, 17, 19, and 21-24), these limitations are directed to a manner of operating the apparatus. The examiner notes that neither the manner of operating a disclosed device nor material/article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from the prior art. See MPEP 2114 and 2115. Further, the examiner notes that intended use limitations, such as “for removing a silicon component from an exhaust gas containing a perfluoride compound and said silicon component”, “for heating said exhaust gas containing said perfluoride compound”, “for decomposing said perfluoride compound contained in said exhaust gas exhausted from said heating apparatus”, “for cooling said exhaust gas exhausted from said catalyst layer” etc., do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents

Art Unit: 1725

thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.” Also see *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) that states “While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function”. See MPEP 2114. To overcome rejections based on these established case laws (as examples), “a catalyst layer...” limitation could be changed from “a catalyst layer filled with a catalyst for decomposing...” to “a catalyst layer filled with a perfluoride decomposing catalyst”, whereas “a cooling apparatus...” limitation could be changed from “a cooling apparatus...for cooling said exhaust gas...” to “an exhaust gas cooling apparatus”.

4. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossin et al. (US 6,069,291) in view of Tom et al. (US 6,030,591), and further in view of either Imamura (US 5,649,985) or Izumikawa et al. (US 6,022,489), as applied to claim 1 above, and further in view of Holst et al. (US 5,955,037).

The former references teach and/or suggest the elements described above. However, these references do not teach the structure of the wet scrubber inlet or the use of a diffusion portion in the wet scrubber.

Holst et al. teach a semiconductor scrubbing process in which the exhaust inlet to the wet scrubber extends into the scrubber at a position lower than the spray apparatus. The inlet opening is designed so that the top portion extends further than the bottom portion, causing an overhang. Holst et al. teach that this design allows for

Art Unit: 1725

the effluent gas stream to be sheathed in a protective gas without premature contacting of the effluent gas with liquid. Holst et al. also teach the use of a demister pad to remove entrained water. (US 5,955,037; column 19, lines 36-67; column 20, lines 15-23; and Figure 10).

It would have been obvious to one of ordinary skill in the art at the time that the applicants' invention was made to have modified the process described above by the teachings of Holst et al. One would have been motivated to use an inlet with an overhang to allow an effluent gas stream to be sheathed in a protective gas without premature contacting of the effluent gas with liquid and to use a demister pad to remove entrained water, as taught by Holst et al.

5. Claims 2, 11, 17-20, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossin et al. (US 6,069,291) in view of Tom et al. (US 6,030,591), and further in view of either Imamura (US 5,649,985) or Izumikawa et al. (US 6,022,489), as applied to claims 1 and 15 above, and further in view of Smith et al. (US 5,417,934).

The former references teach and/or suggest the elements described above. However, these references do not teach the use of a removable catalyst cartridge or temperature sensors.

Smith et al. teach a heated catalyst that includes a heater surrounding a catalyst bed that is contained within a removable cartridge casing. A temperature controller is attached to the catalyst heater and temperature sensors are attached in upper and

lower regions of the cartridge. (US 5,417,934; column 1, lines 10-24; column 2, lines 5-18; column 4, lines 22-23 and 30-40; and Figures 1 and 2). Smith et al. shows the cartridge being removed from the top of the reactor body in Figure 2. However, one of ordinary skill in the art would understand that the cartridge could also be removed from the bottom of the heater and that this might be advantageous when there are bulky conduits or equipment above the reactor.

It would have been obvious to one of ordinary skill in the art at the time that the applicants' invention was made to have modified the process described above by the teachings of Smith et al. One would have been motivated to do so in order to provide sensing means for the operation of a temperature controller and to provide a means for replacing the catalyst used in the reactor. One of ordinary skill in the art would use a detachable acid remover/cooler so it can be removed to gain access to the reactor and removable catalyst cartridge.

Allowable Subject Matter

6. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to teach or suggest a perfluoride compound processing apparatus that includes a casing wherein a cartridge having a catalyst layer formed

inside is removably attached, such that a casing of a reactor is shared with a casing of a heater (dependent claim 12).

Response to Arguments

8. The applicants' arguments filed with the Appeal Brief dated November 1, 2005 (with respect to the rejections of claims 1-24) have been fully considered and are persuasive. Therefore, these rejections have been withdrawn. However, upon further consideration, new grounds of rejection (which includes an additional reference) are made for claims 1-11 and 13-24 (see sections 3-5). It is noted that the prior rejections erroneously did not include reference to claim 9. In addition, claim 12 has now been indicated as allowable subject matter (see sections 6 and 7). The applicants are also referred to the newly underlined portions of section 3, in particular to the "intended use" paragraph (last paragraph of section 3).

In response to applicants' argument that the limitation "to which at least one of water and steam is added after the exhaust gas has exited the silicon component removing apparatus" should be given patentable weight (see underlined portions of pages 15, 17, 18, 22, and 24), a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 12/19/05*
Primary Examiner
Art Unit 1725

KPK
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December 19, 2005